

Additional Notes on the Genus *Lomatocarpa* Pim. (Apiaceae – Apioideae) and Related Taxa of High Asia

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Abstract

Ligusticum wolffianum Fedde ex Wolff and *Cortia schmidii* Nasir described from North East Afghanistan and North Pakistan are determined to be identical with *Lomatocarpa albomarginata* (Schrenk) Pimenov & Lavrova, widely distributed in the adjacent Pamiro-Alai and Tianshan mountain systems. The species is known also from south-western extremity of Chinese autonomous region Xinjiang. A new combination (*L. afghanica*) has been proposed for the species, previously known as *Ligusticum afghanicum*, *Lomatocarpa steineri*, and *Pachyleurum linearilobum*.

Keywords: *Lomatocarpa*, *Ligusticum*, *Cortia*, Apiaceae, Afghanistan, Pakistan.

Introduction

Ligusticum wolffianum Fedde ex H. Wolff and *Cortia schmidii* Nasir were described from the high mountain, not easily accessible region in the core of Asia, where the borders of present states of Tadzhikistan, Afghanistan, Pakistan, India, and China meet. Being the mountain node of the Western Himalaya, Karakorum, Kunlun, Hindukush and Pamiro-Alai, the region offers a natural entity. In the 19th century, the region was a center of competition for the then great powers – the British, Russian and Chinese empires. Many discoveries in natural sciences were made as by-products of this competition. However, its flora was independently explored by botanists from different countries belonging to different scientific schools. Coordination of their independently described taxa of Apiaceae remains to be done now, especially in the light of regional summaries of *Flora of West Pakistan* (Nazir & Ali, 1972), *Conspectus Florae Asiae Mediae* (Pimenov, 1983), *Flora Iranica* (Alava et al. 1987), *Flora Reipublicae Popularis Sinicae* (Shan & Shen, 1979, 1985, 1992) and *Umbelliferae (Apiaceae) of India* (Mukherjee & Constance, 1993). Each of these treatments reflects different points of view on the taxonomy of various plants, being especially true for the Apiaceae, because

generic delimitation in the family, depending on criteria used, is still highly controversial. Here, we follow the traditions of the Russian school with its attention to carpological details. In many cases, this leads to splitting some large artificial genera such as *Peucedanum*, *Ligusticum*, *Pleurospermum* etc.

What is *Ligusticum wolffianum*?

The material used for the description of *Ligusticum wolffianum* Fedde ex Wolff (Wolff, 1930) was collected in 1895 by the British Capt. A.W. Alcock, a member of British-Russian Pamir Boundary Commission. After the description of 1930, *L. wolffianum* practically disappeared from taxonomic literature of the Asiatic Apiaceae. Leute (1970) placed it under *Ligusticum* among *species incertae sedis*. Critical status of *Ligusticum* as a genus with unclear and disputable circumscription adds some interest to this species, described comparatively long time ago. We had searched for a type material of *L. wolffianum* for some years in various herbaria containing Himalayan plants and surprisingly (Alcock as collector is not included in *Index Herbariorum*) we could find it in the herbarium of Forest Research Institute, Dehra Dun (DD)

represented by a good sheet with a completely collected plant at the stage of flowering and beginning of fruiting (Fig. 1). Its original label is "Pamir Boundary Commission, 1895. In nullahs alongside



Figure 1. Type specimen of *Ligusticum wolffianum* Fedde ex H. Wolff (DD).

running water. 14000 to 15000 ft. Coll. Surg. Capt. Alcock, 17712", corresponding Fedde's (or Wolff's?) protologue. There are some notes in the sheet which showed that the plant was previously determined as *Trachydium roylei* Lindl. and C. Norman (1938) later believed that it could probably be a species of *Chamaesciadium*.

Although the fruits on type sheet of *L. wolffianum* are not mature, they have some diagnostic characters which could be a guideline in searching affinity for the species. The mericarps are slightly compressed dorsally with narrowly winged marginal ribs; ribs are broader than dorsal with solitary vittae; endosperm is plane on the commissural side and commissure is broad (exocarp interrupting near the ends of marginal ribs)

(Fig. 2a). Fruits are different from those of *Chamaesciadium* and, especially *Trachydium*. *Chamaesciadium* is not distributed in the Himalaya and Tibet. We compared the characters of root, stems, leaves, umbels and general plant habit in the type sheet of *L. wolffianum*, besides a structure of its fruits and all other elements of the protologue with features of some high mountainous Apiaceae taxa of High Asia (the Himalaya, Tibet, Tianshan and Pamiro-Alai). As a result, we found that Alcock's plant corresponds to *Lomatocarpa albomarginata* (Schrenk) Pimenov & Lavrova, a widely distributed in the mountains of Tianshan and Pamiro-Alai, particularly in Badachschan province of Tadzhikistan (Western and Eastern Pamirs).

This species has rather large synonymy due to complicated generic delimitation in Asiatic high mountainous Apiaceae with similar lifeforms (see Pimenov, 1982; Lavrova *et al.*, 1987; Pimenov & Kljuykov, 2001). The species was initially described in the genus *Neogaya* Meisn. (= *Pachypleurum* Ledeb.) as a variety of *N. simplex* (L.) Meisn. (= *Pachypleurum simplex* (L.) Rchb. During the revision of Middle-Asiatic taxa of the Apiaceae (Pimenov, 1982, 1983) it was elevated to the monotypic genus *Alposelinum* Pim. Simultaneously another genus *Lomatocarpa* Pim. was

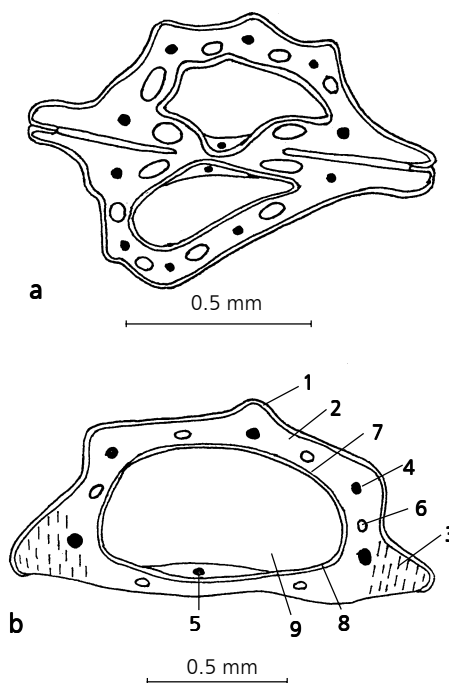


Figure 2. TS of mericarps. **a.** *Ligusticum wolffianum* Fedde ex H. Wolff (type specimen) = *Lomatocarpa albomarginata* (Schrenk) Pimenov & Lavrova; **b.** *Lomatocarpa albomarginata* (Schrenk) Pimenov & Lavrova (Tadzhikistan, Mts. Hissar, pass Anzob, 23.07.1974, M.G.Pimenov & E.V.Kljuykov - 573, MW).

Table 1. Diagnostic characters of *Ligusticum*, *Lomatocarpa* and *Cortia*

Character	<i>Ligusticum</i> s. str. (e.g. <i>L. scoticum</i> s.l.)	<i>Ligusticum wolffianum</i> <i>Cortia schmidii</i>	<i>Lomatocarpa</i>	<i>Cortia</i>
1. Life form	perennial polycarpics	perennial monocarpics	perennial monocarpics & polycarpics	perennial monocarpics
2. Caudex	branched	entire	entire or branched	entire
3. Leaf	bipinnate	bipinnate	pinnate or bipinnate	tri pinnate
4. Leaf basal segments	with long petiolules	with short petiolules	sessile or with short petiolules	with short petiolules
5. Terminal leaf lobes	ovate, dentate	linear	elliptic, denate or linear	narrowly lanceolate or elliptic
6. Stem	developed, branched, leafy	simple, scape, leafless	simple, scape leafless or rarer with 1-2 leaves	absent or very short
7. Petioles (TS)	round	?	sulcate	almost round
8. Umbels	7-13 rayed, 4-10cm in diam.	10-13 rayed, 2 cm in diam.	10-16 rayed, 1.5-2 cm in diam.	5-25 rayed, 10-25 cm in diam.
9. Bracts	1-5, usually entire, linear-oblong	6-8, entire, linear-lanceolate, membranous along the margin	5-8, entire, linear-lanceolate, membranous along the margin	2-15, pinnate
10. Bracteoles	5-7, entire, linear-oblong	6-8, entire, narrowly lanceolate	6-10, entire, narrowly lanceolate	10-20, pinnate
11. Calyx teeth	triangular	triangular	triangular	linear-lanceolate to linear
12. Mericarps	slightly compressed dorsally	compressed dorsally	compressed dorsally	slightly compressed dorsally
13. Mericarp ribs	marginal aliform, slightly broader than dorsal	marginal aliform, dorsally keeled	marginal aliform, dorsal keeled or filiform	marginal aliform, slightly broader than dorsal
14. Commissure	narrow, exocarp interrupting near column	broad, exocarp interrupting near distal ends of marginal ribs	broad, exocarp interrupting near distal ends of marginal ribs	narrow, exocarp interrupting almost near the column
15. Vittae	2-5 in vallecules, 4-10 on commissure	vallecules solitary, 2 on commissure	1-3 in vallecules 2-10 on commissure	1 (rare 2) in vallecules, 2 (rare 4) on commissure
16. Seed	occupies only part of pericarp cavity.	occupies whole pericarp cavity	occupies whole pericarp cavity	occupies whole pericarp cavity

separated with type species *L. korovinii* Pim. Being similar in many characters, these two genera differ mainly in number of mericarp vallecular vittae, the character, which Leute (1969, 1970) regarded as valuable for generic delimitation in *Ligusticum* alliance. Later (Lavrova *et al.*, 1987), more complete comparative analysis of the alliance ("subtribe Foeniculinae Dumort.") was made and the value of vallecular vittae number was shown of lesser discriminant value. Taking into account the whole character variation in the group, the difference between *Lomatocarpa* and *Alposelinum* appeared not so significant, lesser than differences among another genera. Hence, *Alposelinum* was reduced to a section of *Lomatocarpa*.

The species area was determined as large one, including South and South East Kazakhstan, Kirghyza, Uzbekistan and Tadzhikistan. The locality where Capt. Alcock collected *L. wolffianum* is in the same broad area, most probably in the present Afghan territory. For Afghanistan, it is formally a novelty genus as well as species.

About *Cortia schmidii*

Cortia schmidii Nasir was described (Nasir, 1972) from Chitral in North Pakistan. The similarity of *C. schmidii* with *Ligusticum* was noted in protologue (according to species' author, this was not *Ligusticum* because of its solitary vittae in some mericarp furrows). At the same time Nasir (1972) emphasised how it differed from *C. depressa* in having entire bracts and bractlets (not pinnatifid as in *C. depressa*) and even changed the generic description of *Cortia*. The fruits of *C. schmidii* were described only in general disregarding some essential characters. However, one can compare its fruits with that of *Lomatocarpa albomarginata* (Fig. 2b) and *Ligusticum wolffianum* to see that they are very similar. This is one carpological type. Other characters of *C. schmidii* also coincide with both these species. Farille and Malla (Farille *et al.*, 1985) transferred *C. schmidii* to *Ligusticum*. Then Rechinger (1987) and, Mukherjee and Constance (1993) put it in the synonymy of *Ligusticum afghanicum* Rechb. f. described earlier (Rechinger & Riedl, 1963). *C. schmidii* and *L. afghanicum* are, without any doubt, different species, in spite of being similar in their life forms. Their mericarp secretory systems are different, although both species could be referred to the same genus.

The diagnostic characters of *Ligusticum wolffianum*, *Cortia schmidii*, *Ligusticum* and *Cortia*, the genera in which they were described and *Lomatocarpa* are summed up in Table.1.

The taxonomic and nomenclatural summary of the species is as follows:

Lomatocarpa albomarginata (Schrenk) Pimenov *et* Lavrova, Bot. Zhurn. 72, 1: 35. 1987; Pimenov & Kljuykov, Acta Phytotax. Sin. 39, 3: 195. 2001; & Umbell. Kirghyz. 162, t. 23 b, map 16 b. 2002. *Neogaya simplex* (L.) Meisn. var. *albomarginata* Schrenk in Fisch. et C.A.Mey., Enum. Pl. Nov. Schrenk 2: 41. 1842. *Pachypleurum albomarginatum* (Schrenk) Rupr., Mém. Acad. Sci. St. Petersb. (Sci. Phys.-Math.), ser. 7, 14, 4 (Sert. Tianschan.): 49. 1869. *Neogaya albomarginata* (Schrenk) O. et B.Fedtsch., Consp. Fl. Turkest. 3: 97. 1909. *Alposelinum albomarginatum* (Schrenk) Pimenov, Bull. Soc. Nat. Mosc., div. biol. 87, 1: 113. 1982; & in Consp. Fl. As. Med. 7: 267. 1983; Korovin *et al.*, in Fl. Tadzhik. 7: 142. 1964. Type: Kazakhstan "Songarei, Dshatyk. 22.07.1841. A.I.Schrenk, 851" (holotype - LE!). *Ligusticum wolffianum* Fedde ex H. Wolff, Feddes Repert. 27: 318. 1930, **syn. nov.** Type: Afghanistan "Pamir [Pamir Boundary Commission], in nullahs alongside running water, 14000-15000 ft. 1895. [A.W.] Alcock, 17712" (lectotype - DD!, designated here). *Pachypleurum aemulans* Korovin, Fl. Kazakhst. 6: 309. 1963, nom. inval., descr. ross. *Cortia schmidii* Nasir, Fl. West Pakist. 20: 115, fig. 34 (A-C). 1972, **syn. nov.**

Type: Pakistan "Chitral, upper Yarkhun Vy. Schmid, 2365" (holotype - RAW, n.v.). *Ligusticum schmidii* (Nasir) Farille et Malla, Candollea 40, 2: 551. 1985.

Pachypleurum alpinum auct. non Ledeb. : Schischk. Fl. URSS 16: 579. 1950, p.p.

Chromosome number: $n=11$; $2n=22$ (Retina & Pimenov, 1977; Vasil'eva *et al.*, 1991).

Distribution: China (North West China: Xinjiang Weiwuer A.R.), Pakistan, Kazakhstan (S: S Kazakhstan d., Zhambyl d.; SE: Taldy-Kurgan d., Almaty d.), Kirghizia, Tadzhikistan, Uzbekistan, Afghanistan (Fig. 3).

The indication for Xinjiang is based on our determination made during our checking of very interesting Apiaceae collections of XJBI (Pimenov & Kljuykov, 2001); this locality is quite natural if to take into account the wide distribution of species in the high mountains of adjacent Kirghizia and Tadzhikistan.

Lomatocarpa afghanica

Some nomenclatural changes are to be made for another species of *Lomatocarpa* distributed in the regions adjacent to the area of *L. albomarginata*. The species was described from Tadzhikistan as

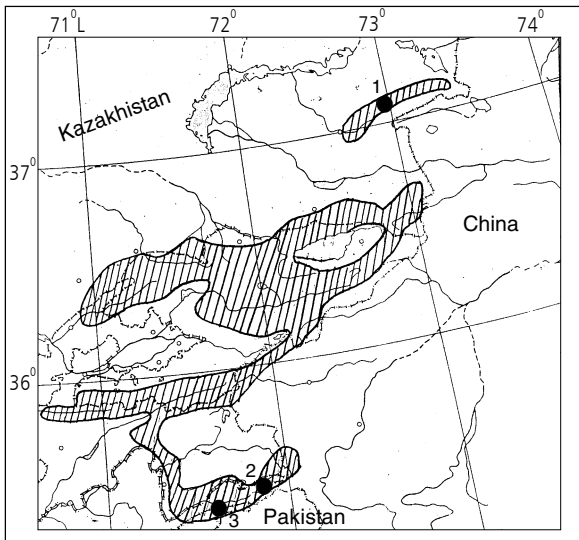


Figure 3. Distribution of *Lomatocarpa albomarginata* (Schrenk) Pimenov & Lavrova. Type localities of: 1. *Neogaya simplex* var. *albomarginata*, 2. *Ligusticum wolffianum*, 3. *Cortia schmidii*.

Pachypleurum linearilobum Korovin (Korovin, 1973). Later (Pimenov, 1982), it was synonymized with *Ligusticum steineri* Podlech, earlier described by Podlech (1970) and a nomenclatural combination of *Lomatocarpa steineri* has been proposed. However, Rechinger (1987) put *Ligusticum steineri* into the synonymy of *Ligusticum afghanicum* Rech.f. and, when the type materials were checked in W, we confirmed the identity of these species. This identification did not influence the generic attribution of the species to *Lomatocarpa*. In 1995 the combination in *Lomatocarpa* was proposed by Pimenov, but without complete citation of basionym. So, to legitimise the name, we propose it again in accordance with the ICBN.

***Lomatocarpa afghanica* (Rech.f.) Pimenov, comb. nov.** *Ligusticum afghanicum* Rech.f., Kongel. Danske Vidensk. Selsk. Skr. 13, 4 (Symb. Afghan. 5): 94, fig. 57, 58. 1963; Podlech, Mitt. Bot. Staatsamml. München 13: 459. 1977; Rech.f., Fl. Iran. 162: 357, tab. 288. 1987, p.p.; P.K.Mukh. & Constance, Umbell. (Apiaceae) India: 173. 1993.

Type: Afghanistan "NE [Afghanistan]: Nuristan: Sanglich, Minjan Prov., 1300 ft., among stones and gravel. 27.07.1937. W.Koelz, 12633" (Lectotype, W!, designated here; isotype, US). *Ligusticum steineri* Podlech, Mitt. Bot. Staatsamml. München 8: 173. 1970. *Lomatocarpa steineri* (Podlech) Pimenov, Bjull. Moskovsk. Obsc. Isp. Prir. Otd. Biol. 87, 1: 116. 1982; & Consp. Fl. As. Med. 7: 268. 1983; Korovin et al., Fl. Tadzhik. SSR 7: 143, tab. 21, fig. 7, 8. 1984. Type: Afghanistan "Nordost-Afghanistan, prov. Kapisa, Oberes Panjir-Tal, Passhöhe am Übergang von Kur-Petau in das obere Dekhawak-Tal. 3800 m. 9.08.1965.

D.Podlech, 12497" (Holotype, M!).

= *Pachypleurum linearilobum* Korovin, Izv. Akad. Nauk Tadzhiksk. SSR Otd. Estest. Nauk 2(51): 9. 1973. Type: Tadzhikistan "Pamir occidentalis, regio Schachdariensis, adversus pago Roschkaly, in altitudine 3800 m s.m. 29.07.1960. O.E.Agachanajanz, 277" (Holotype, TAD!).

Distribution: Pakistan, Tadzhikistan, Afghanistan.

As a result, the area of the genus *Lomatocarpa* now includes North East Afghanistan, North Pakistan and South West Xinjiang (China), besides Kazakhstan, Uzbekistan, Kirghyza and Tadzhikistan. (Fig. 3)

Acknowledgements

Authors are thankful to the Russian Foundation for Fundamental Sciences (RFFI) for financial support and the curators of DD, LE, M, TAD and W for research facilities and Prof. P.K.Mukherjee for valuable comments.

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Received : 12.02.01

Revised and accepted : 18.04.05